

Climate Change Adaptation Guidance – Gardens and Parks

Lawns and Grass Paths

Climate change vulnerability: high

Lawns and grass paths – introduction

Managed grass swards play a key role in the design of gardens, parks and designed landscapes in the United Kingdom. They provide open areas for recreation and access, as well as views across the lawned space or out into the surrounding landscape.

Close-cut or grazed lawns have been a feature of historic houses since medieval times and they continue to provide a historically appropriate setting for these buildings today.

Most lawns are made up of a mixture of grass species. These grasses are adapted to cope with periods of drought by becoming dormant, but they require frequent rainfall or irrigation in summer to be maintained as a lush green sward. As they grow from the base rather than the tip, grasses are also tolerant of being crushed underfoot and mown over. However, they are not adapted to withstand high volumes of wear when wet: this causes permanent damage to their growing points as well as compaction around their roots.

The changing climate, with prolonged periods of drought, wet winters and sudden, very high rainfall, is making lawn maintenance increasingly difficult and costly. This is compounding the challenges many public gardens face from high footfall throughout the year. For many gardens, a busy but wet Easter period can cause irreparable damage to lawns, which will remain weak and unsightly for the rest of the spring and summer.



The south lawn at Kingston Lacy, Dorset (© National Trust Images/James Dobson).

Lawns and grass paths – why do they matter?

From awe-inspiring vistas to narrow garden paths, green grass is an important feature of the United Kingdom's historic gardens, parks and designed landscapes. It has a unique feel beneath the feet and a softness to the eye, and provides the perfect setting for built structures and planted areas.

Grass paths linking areas of the garden are key to the design of many gardens, including those in the Arts and Crafts style such as Hidcote in Gloucestershire. In gardens open to the public or used for events, these paths may be subject to a lot of foot traffic, so that worn patches along paths or in pinch-points are common, especially after periods of wet weather. In gardens with minimal visitors in winter, these worn patches can usually be repaired. However, in gardens open to visitors year-round there is rarely an opportunity for repair, meaning that bare patches may persist all year. Introducing hard surfaces to facilitate all-weather access can significantly alter the character of gardens and disrupt sightlines. Such changes also require planning permission and incur significant costs.

Summer drought also puts pressure on turf of all kinds. Watering through drought to retain a green sward is not sustainable (especially for places dependent on mains water) and can create a bad impression in public gardens, especially when visitors may be subject to hosepipe bans in their own gardens. However, allowing lawns to turn brown for many months of the year alters the look of a garden and impairs the enjoyment they provide: a dry, brown lawn is not as inviting for picnicking, playing or admiring a view. Other changes, such as introducing different grass species or allowing grass to grow long to improve its ability to withstand drought, will also alter the character of a garden.



Lawns and grass paths – hazards, impacts and options

Hazard	Impact	Options
Drought and heat	Prolonged periods of dry, dormant grass. Worn patches that are hard to reseed/returf and do not recover naturally. Compacted ground is less able to absorb water when rain does fall. Permanent death of lawn or some grass species.	Mow less frequently and raise height of mower blades. Allow grass to brown and provide signage plus blankets/chairs for visitors. Collect rainwater in large volumes and irrigate areas critical for setting or visitor experience. Change to more drought-tolerant grass species and/or include clovers. Redesign area (e.g. meadow, trees for shade, borders with hard path). Care for turf in autumn to reduce compaction and increase the lawn's ability to absorb moisture.
Waterlogging and flooding	 Worn areas created which persist all year. Visitors trampling mud through site (poor experience, increased workload for staff plus potential spread of plant diseases). Paths or lawns closed. More staff resources and budget spent on repairs and maintenance. Only the most hardwearing species survive, which changes the look of a historic lawn. Lawns unusable for hosting events. 	More turf care (e.g. scarification and spiking) to reduce compaction and increase the lawn's ability to drain. Use ground protection matting for vehicles or events. Avoid hosting events on fragile lawns. Close paths in wet weather, provide signage and alternative routes. Install drainage. Address flood management issues in wider catchment. Accept flooding and create planted areas to absorb run off (rain gardens). Change to hard surface (with appropriate drainage).
Milder winters	Grass continues to grow all year and requires cutting when soil conditions are not suitable. Increased visitor use in winter when ground is wet, leading to wear of lawns and grass paths (as above).	Account for additional staff time. Invest in robotic mowers. Create alternative routes in winter. Change style of planting (e.g. meadow).



Image credit:

The parterre at Cliveden in Berkshire, with parched grass (© National Trust Images/Hugh Mothersole. All rights reserved).



Image credit:

Increasingly frequent flooding of the lawned terrace at Shugborough in Staffordshire is being addressed holistically, by understanding where flood water can be slowed and absorbed in the wider landscape (Jen Holsey).

Lawns and grass paths – options and thresholds

The extremes of weather associated with climate change mean that many turfed areas can no longer support high visitor usage, either temporarily or permanently. Turf may require relaying or resowing annually, which leads to increased costs and further restrictions on use.

Specific options for adaptation measures include:

Reduce wear – grass paths can be widened to spread foot traffic. Overhanging branches can be removed and shrubs cut back to reduce shade, improve health of turf and reduce problems associated with driplines.

Improve soil condition – compaction can be relieved and drainage improved with spiking/slitting and incorporating sand. This may also increase the vigour of turf to help it better withstand wear.

Install drainage beneath turf – this generally just relocates the problem but may be a solution in some situations.

Alternative routes – closing off grassed areas prone to waterlogging can help protect turf. Signage and appropriate



barriers are needed and, if routes around the garden are affected, new visitor maps may be required. Sufficient access must be provided to key features.

Amend species mix – explore using more hard-wearing species such as ryegrass or specialist drought-tolerant mixes, and including traditional clover or microclover. This will alter the appearance of the lawn.

Turf reinforcement – various grass protection mats are available and widely used to protect the growing points of grass from wear in wet conditions. They are usually rubber or plastic and can be made of recycled and recyclable materials. These mats are best used as a temporary solution as they are not effective in the long term and can be unsightly.

Paving – where appropriate, pinch points and paths that are required to provide access but cannot support it may need to be paved. Planning permission will probably be required and choice of design and materials must be carefully considered. A heritage impact assessment may also be needed in historic gardens, parks or designed landscapes.

Less mowing – allowing grass to grow longer in summer can help it withstand drought and wear better. This may be the most sustainable solution, but the aesthetic is different and messaging may be required to explain the look to visitors.



Thresholds & tipping points

At what point might you diverge from your current maintenance/management strategy? What are the events/things that may trigger this change of approach (action/philosophy)?

- · Frequency of grass path and lawn closures.
- · Increased/better winter access required.
- No opportunity for repairs within calendar year.
- Evaluation of the significance of the grass area and whether it is part of the original design.

Image credits:

Left to right: Rubber matting showing through where it has been used to try to manage wear on a grass pathway at The Courts, Wiltshire (P. Alexander); paving at Bodnant, Conwy, to resolve worn pinch point on lawn (R. Bevan); lawn at Knighthayes, Devon, closed for recovery with neat rope barrier and explanatory sign (R. Bevan).



Lawns and grass paths – worked pathway example

This page applies pathways and thresholds to a real site example, showing how you might respond to a climate hazard and move between adaptation options.

A multi-disciplinary group will be needed to decide which course of action to take and when to change approach. This should include horticulturalists, curators, visitor facilities experts and site managers. Where options involve changes to hard surfaces, buildings surveyors and planners may need to be consulted. For registered sites it may be best to involve the Gardens Trust. Where options include installing drainage or management of flood water in the wider catchment, experts in these areas will be needed.

It may not be possible to find a perfect solution and certain compromises may be needed, balancing aesthetics with access. Pathway options will vary depending on the significance of the site and the public benefits of all-weather access. It may also be necessary to consider the nature conservation value of the existing turf, especially if protected species such as orchids or wax cap fungi are present (though these species are unlikely in areas with heavy footfall). The worked pathway example¹ below is based on the options available for a grass path routinely showing excessive wear after periods of wet weather. Traditionally, the starting point for addressing this is returfing or reseeding worn areas annually, but where this becomes unsustainable and path closures, temporary matting or improved drainage are insufficient, then changes of surface are likely to be the best option. As the frequency and intensity of wet weather continues to increase, temporary path closures or changes of route around the site may still be required following changes to the path surfaces.

Change path surface Stepping-stones (if appropriate) Improve drainage beneath turf Temporary matting (if necessary) Temporary closures/alternative routes Re-turfing/re-seeding in the spring Time/frequency and intensity of wet weather

Drought-tolerant species

A number of grass seed suppliers are now marketing grass seed for very dry conditions. Sites are advised to trial these species in a limited area before making the switch, to ensure they find a selection best suited to their local conditions and with an appropriate appearance for the site.



(Response thresholds are most likely to be based on visitor complaints and inaccessibility of paths because of damage to turf from saturated conditions throughout the winter and shoulder months. These factors are balanced by site operational behaviours and requirements. The specific trigger points would need to be agreed by the operations decision-maker and relevant consultants and consultees such as the gardeners and rangers working at a site. Design and significance of the asset might impact your thresholds and options within the Dynamic Adaptive Policy Pathway.)

¹ Dynamic Adaptive Pathways Approach (Haasnoot, Kwakkel, Walker & Ter Maat, 2013).

Case studies, signposting and references

These case studies show adaptation in action and highlight where approaches have been tried out across properties in the National Trust's care.

At **Polesden Lacey in Surrey**, the main lawn is on freedraining, thin soil on a sunny hillside. This makes it vulnerable to drought and it quickly appears parched during hot spells. Despite being a popular area for visitors (where deckchairs are provided), it is not irrigated since this is not considered sustainable. Instead, grass is left to grow longer to make it more resilient to drought and reduce compaction. Some complaints have been received from visitors about the less formal look, but staff have countered these with an explanation about the changing climate and their obligations regarding water use.

At **Hidcote in Gloucestershire**, some of the grass pathways are critical to the design of the garden and cannot be replaced with paving despite high visitor numbers and the pressure from drought and sudden high rainfall events. Various interventions have been made, including increasing aeration and maintenance, installing drainage beneath turf, lightening the clay soil with sand, and sowing hardwearing rye grasses (which are not an ideal look for an Edwardian garden). However, periodic closures of paths are still required to allow the grass to rest. This is done in such a way that key vistas are maintained.

At **Standen in West Sussex**, a turf path along a terrace frequently became churned and unusable, as rain water collected there and drained slowly. After discussion with planners and the curator, the turf was replaced with a hard path. Compacted type 1 gravel was used and the final surface finish is yet to be installed. Crucially, drainage was also required to allow water coming down the terrace to escape through the wall.

Signposting & additional guidance

National Trust staff will find additional resources on turf care, path design and year-round access in the <u>Best</u>. <u>Practice Guides on the Garden and Parks Acorn pages</u>.

Changes to registered gardens and parks require consultation with the local <u>Gardens Trust</u> as well as <u>Historic</u> <u>England</u>, <u>Cadw</u>, or Heritage Gardens Archive (NI), and may require a heritage impact assessment.



Image credits:

Left to right: A waterlogged grass path on the top terrace at Standen following a busy but wet Easter (M. Bufin); the same path after resurfacing with compacted gravel (© National Trust Images/Chris Davies).